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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,536

12/19/2005

Yukihiro Oishi

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EXAMINER

VELASQUEZ, VANESSA T

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,536	<b>Applicant(s)</b> OISHI ET AL.	
	<b>Examiner</b> Vanessa Velasquez	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 6-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 21-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☒ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Claims***

Claims 1-5 and 21-23 are presented for examination. Claims 6-20 are withdrawn.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thum & Lorenz (Centre of Darmstadt College of Higher Education, pp. 667-673, Vol. 84, No. 26, English translation) in view of Housh et al. ("Selection and Application of Magnesium and Magnesium Alloys," Vol. 2, ASM Handbooks Online) and Hawley's Condensed Chemical Dictionary (14<sup>th</sup> ed., revised by Richard Lewis, Sr.), with evidence from Webster's New World Dictionary (3<sup>rd</sup> College ed., Victoria Neufeldt, Editor).

Regarding Claim 1, Thum & Lorenz report their findings on the mechanical properties of different magnesium-based threaded fasteners comprising bolts and nuts (Thum & Lorenz, see threaded fasteners #1-6, p. 3-4). By definition, a bolt typically has a head portion and a threaded body like a screw (Webster's, p. 157, drawings in col. 2). The magnesium-based alloys have tensile strengths ranging from 24 kg/mm<sup>2</sup> to 35 kg/mm<sup>2</sup> (approximately 235 MPa to 343 MPa) (Thum & Lorenz, Table 1).

Still regarding Claim 1, Thum & Lorenz fail to teach that the magnesium fasteners are made from drawn magnesium wire. However, Housh et al. teach that it is desirable to draw magnesium alloys because the drawing operation prevents the need to repeatedly anneal and redraw said alloy in subsequent processing steps, thereby decreasing the number of manufacturing steps required and lowering fabrication costs (p. 6, second paragraph). Furthermore, drawing is as a standard method for producing metal wires (Hawley's, "draw" entry). Therefore, it would have been obvious to one of ordinary skill in the art to form the bolts of Thum & Lorenz from the drawn wires of Housh and Hawley's because the drawing would eliminate additional processing steps, making the manufacturing process more cost-effective and efficient as explained above.

Regarding Claims 2 and 3, magnesium-based alloy Magnewin 3512 contains 3% Al, 1% Zn, and 0.2% - 0.5% Mn (Table 1). The Examiner will interpret the chemical compositions in the prior art to be percentages by weight.

Regarding Claim 4, Thum & Lorenz teach a magnesium-based alloy threaded fastener containing Al, Zn, and Mn, but fail to teach a fastener containing Mg, Zn, Zr. However, Housh et al. teaches that the alloy designated ZE63A-T6 contains 5.8 wt% Zn, 0.7 wt% Zr, the balance Mg (p. 4). It would have been obvious to one of ordinary skill in the art to form ZE63A-T6 into a screw because of its outstanding physical and mechanical properties. ZE63A-T6 has a tensile strength of 300 MPa (Housh et al., p. 4) and is lightweight compared to its more dense counterparts such as aluminum, titanium, and iron. Lightweight components are particularly advantageous in vehicles in which weight is a critical factor (e.g., aerospace) as lighter parts contribute to the reduced fuel

consumption (Thum & Lorenz, first paragraph; Housh et al., "Introduction," first paragraph).

Regarding claim 5, the instant claim encompasses zero percent by mass of rare earth element. Because none of the magnesium-based alloys in Thum & Lorenz contain a rare earth element, any of the alloys would anticipate this composition limitation.

Regarding Claims 22 and 23, the claims are product-by-process claims. It has been held that "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thum & Lorenz (Centre of Darmstadt College of Higher Education, pp. 667-673, Vol. 84, No. 26, English translation) in view of Housh et al. ("Selection and Application of Magnesium and Magnesium Alloys," Vol. 2, ASM Handbooks Online) and Hawley's Condensed Chemical Dictionary (14<sup>th</sup> ed., revised by Richard Lewis, Sr.), and further in view of Higgins (Engineering Metallurgy, Part I: Applied Physical Metallurgy, 6<sup>th</sup> ed., pp. 90-94) and Callister, Jr. (*Materials Science & Engineering, An Introduction*, 6<sup>th</sup> ed.), with

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evidence from Webster's New World Dictionary (3<sup>rd</sup> College ed., Victoria Neufeldt, Editor).

Regarding Claim 21, Thum & Lorenz in view of Housh et al. and Hawley's are silent as to the grain diameter of the magnesium alloy. However, grain diameter is a result of the degree of deformation imparted to any alloy, as taught by Higgins (Fig. 4.18, p. 94). Therefore, achieving the claimed grain size would require merely routine optimization of the drawing process by one of ordinary skill. It would have been obvious to one of ordinary skill in the art to draw the magnesium wire taught by Thum & Lorenz in view of Housh et al. and Hawley's such that the deformation imparted by the drawing operation of Housh et al. produces an alloy with a particular grain size, such as that not exceeding 15 microns as claimed, in order to obtain a screw with specific set of desired mechanical properties. Furthermore, grain size is a result-effective variable, as taught by Callister, Jr., where the Hall-Petch relationship shows that the smaller the grain, the stronger the material (Equation 7.5, Figure 7.13, p. 175). Thus, it would have further been obvious to one of ordinary skill in the art to suppress the grain diameter to less than 15 microns as claimed because smaller-grained materials have enhanced mechanical properties. (MPEP § 2144.05 "Optimization of Ranges")

### ***Response to Arguments***

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection above.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is (571)270-3587. The examiner can normally be reached on Monday-Friday 8:30 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

/Vanessa Velasquez/  
Examiner, Art Unit 1793